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Silver Bow Creek/Butte Area Superfund Site

WARM SPRINGS PONDS INACTIVE AREA PROPOSED PLAN

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U.S. Environmental Protection Agency, Montana Office
and the
Montana Department of Health & Environmental Sciences

March 1992

EPA Announces Preferred Remedy for the Warm Springs Ponds Inactive Area

The U.S. Environmental Protection Agency (EPA) announces its preferred remedy for the contaminated tailings, soils and sediments, and ground water within and below Pond 1 of the Warm Springs Ponds System. This area is also referred to as the Inactive Area of the Warm Springs Ponds. The ponds are located 7 miles east of Anaconda at the confluence of Silver Bow Creek and the Clark Fork River.

Briefly, the preferred remedy for the Inactive Area is a modification of Alternative 5, which proposes to:

1. Flood the tailings that are already wet or submerged (wet-closure) and chemically neutralize the metals that are bound within them with lime (chemical fixation).
2. Cover the dewatered or partially dewatered tailings with lime and clean soil (dry-closure).
3. Relocate and restore the lower Mill-Willow Bypass channel and convert the present channel into a groundwater interception trench.
4. Strengthen the Pond 1 berms to meet flood and earthquake protection requirements and construct a new flood protection berm adjacent to the relocated bypass channel.
5. Construct a runoff interception system along the east side of the Inactive Area.
6. Implement long-term monitoring.

Because the preferred remedy proposes to leave the tailings in place, if selected, it will be an interim remedy.

Community Role In The Selection Process

Public Comment Period

EPA will conduct a 30-day public comment period from April 2 to May 1, 1992 to provide an opportunity for public involvement in the final remedy decision. During the comment period, the public is invited to review this Proposed Plan and other reports and to offer comments to EPA.

Public Hearings

EPA will hold public hearings as an opportunity for people to comment on the preferred remedy after they have heard the presentations and have reviewed this Proposed Plan. Comments will be transcribed and a copy of the transcript will be added to the Administrative Record available at the EPA Helena office. The meeting dates are as follows:

Monday, April 27, 1992, 7 p.m.
Copper Village Museum & Art Center
Anaconda, Montana
and
Tuesday, April 28, 1992, 7 p.m.
St. Patrick Hospital
Missoula, Montana

Written Comments

If you would like to comment in writing on EPA's preferred remedy, any of the other alternatives examined, or other issues relevant to the site remediation, please deliver comments to EPA at the public hearing or by mail to Scott Brown, EPA Project Officer, at the address on the back page of this Proposed Plan.

EPA's Review of Public Comment

EPA has already reviewed comments received from the public as part of the remedy selection process for the Inactive Area of Warm Springs Ponds. However, further comments may be made during the public comment period. EPA's final choice of remedy will be issued in a decision document for the Inactive Area this spring. A responsiveness summary, which summarizes EPA's responses to comments received during the public comment period, will be issued with the decision document. Once the document is signed by the EPA Regional Administrator, it will become a part of the Administrative Record.

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The preferred remedy was selected from 11 alternative remedies examined by EPA, following consultation with the Montana Department of Health and Environmental Sciences (MDHES), other federal and state agencies, the public, and the Atlantic Richfield Company (ARCO), the owner of the Warm Springs Ponds. The 11 alternatives include proposals for wet-closure and chemical fixation, dry-closure, partial and total removal, and combinations of these remedial alternatives. A no-action alternative was also examined.

If finally selected, Alternative 5, as modified, will accomplish the following objectives:

- Fulfill the requirements of law
- Protect human health and the environment
- Be implemented more safely and readily than other alternatives
- Be cost effective
- Protect and restore productive wetlands and enhance fish and waterfowl habitat

A more detailed description of the preferred remedy and the complete rationale for its selection are presented later in this document.

Introduction and Background

The Proposed Plan is an important final step in the remedy selection process for a Superfund site. The Proposed Plan provides a summary of all the alternatives examined in the feasibility studies, traces the steps that led EPA to recommend a particular remedy, and allows formal public participation before a final remedial action plan is adopted. A Proposed Plan and full public review are required by law. (See footnote.)

It is important for the public to recognize that the preferred remedy is a preliminary recommendation. It is subject to modification or possible rejection, and public comments may cause EPA to reconsider its recommendation. Therefore, readers are urged to consider all of the alternatives examined in the feasibility studies and comment accordingly.

Evidence of EPA's willingness to reconsider a preliminary recommendation such as the one offered in this Proposed Plan is as recent and pertinent as the remedy selection process for the Warm Springs Ponds Active Area. Overwhelming public opposition to an impoundment, which was proposed for an area near the community of Opportunity, compelled EPA to reject plans for the impoundment and combine the elements of other alternatives to devise an acceptable remedy.

The following documents provide the basis for EPA's recommendation to adopt a modified Alternative 5 as the preferred remedy.

1. Multitech, 1987. Phase I Remedial Investigation Report.
2. CH2M HILL, 1989. Phase II Remedial Investigation Report.
3. MDHES, 1989. Feasibility Study for the Warm Springs Ponds Operable Unit. Volume I, Report: Volume II, Appendixes.
4. USEPA, September 1990. Record of Decision, Silver Bow Creek/Butte Area NPL Site, Warm Springs Ponds Operable Unit, Upper Clark Fork River Basin, Montana, as modified by the June 1992 Explanation of Significant Differences.
5. USEPA, June 1991a. Explanation of Significant Differences, SBC/Butte Area NPL Site, WSP OU, Upper CFR Basin, Montana.
6. CH2M HILL, July 1991. Warm Springs Pond Update.
7. ESA Consultants, September 1991. Draft Evaluation of Alternatives for Pond 1 and Below, SBC/Butte Area NPL Site, WSP OU, Warm Springs Ponds, Montana.
8. CH2M HILL, March 1992. Technical Memorandum on Removal of Tailings and Associated Soils/Pond Bottom Sediments, Pond 1 and Below.

In the case of the Inactive Area, EPA has endeavored for over a year to involve all affected parties before arriving at a decision to recommend a particular remedy. Five public scoping meetings have been held throughout the Clark Fork River basin, and supplemental feasibility studies have been conducted in response to concerns expressed by the public.

These reports and other pertinent documents for the Warm Springs Ponds Inactive Area are contained in the Administrative Record file, EPA office, Helena Federal Building, 301 South Park, Helena, Montana, 59626-0096. They are available for public review during regular work hours. Appointments are encouraged and telephone numbers are provided at the end of this Proposed Plan.

[1]Section 117(a) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), require published notice of a Proposed Plan, a reasonable opportunity for the public to submit written and oral comments, and a reasonable opportunity for a public meeting at or near the site, before a final remedy is adopted or undertaken.

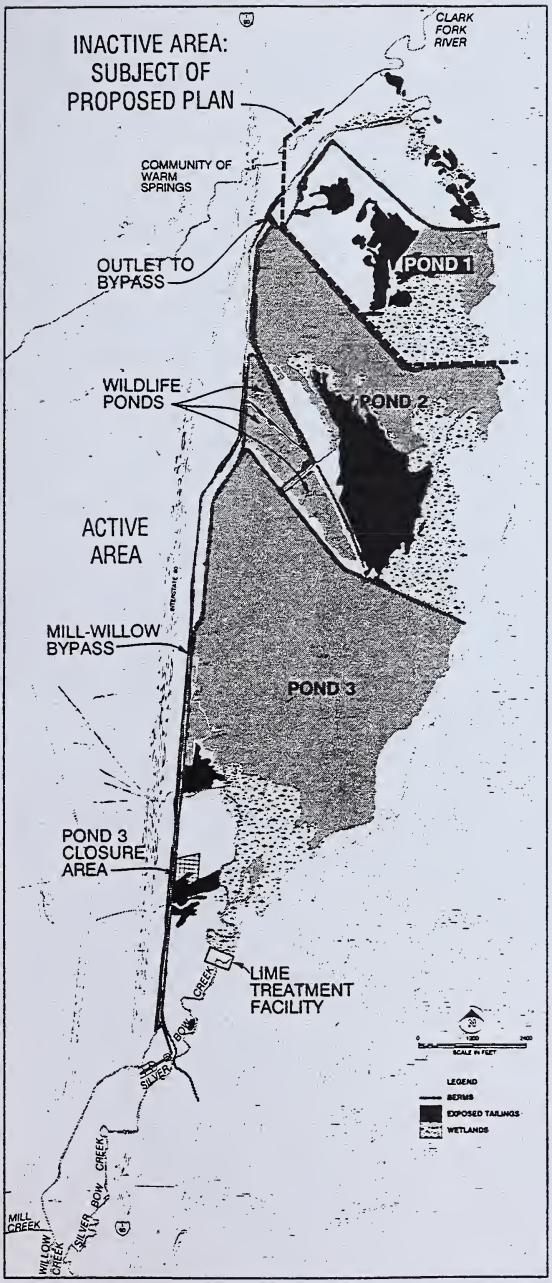


Figure 1
Components of Warm Springs Ponds

Site History and Characterization

The Warm Springs Ponds are part of the Silver Bow Creek/ Butte Area Superfund site. This massive site has been divided into several administrative units, often called operable units. They include the Butte Area operable units (Mine Flooding, Priority Soils, Nonpriority Soils, and the Active Mine Area) and the Silver Bow Creek operable units (Streamside Tailings, Rocker and the Warm Springs Ponds).

The Warm Springs Ponds themselves consist of two separate operable units: (a) the Active Area (Ponds 2 and 3, the Wildlife Ponds, and most of the Mill-Willow Bypass) and (b) the Inactive Area (Pond 1 and the area below Pond 1, which includes the historic Silver Bow Creek channel, and the lower portion of the Mill-Willow Bypass). See Figure 1.

Three separate response actions are underway for the Warm Springs Ponds:

- Mill-Willow Bypass Removal Action (nearly completed)
- Remedial Action for the Active Area (to begin in June 1992 and to be completed within 24 months)
- Remedy Selection for the Inactive Area (the subject of this Proposed Plan)

The Inactive Area contains approximately 4 million cubic yards of tailings within Pond 1 and an additional 1.5 million cubic yards of tailings below Pond 1. Tailings deposits and contaminated underlying soils reach depths of 8 to 10 feet in these areas. Roughly one-third of Pond 1 (eastern portion) contains tailings submerged in water; the remaining two-thirds (middle and western portions) contain tailings that appear dry on the surface, but are generally in contact with the ground water. The contaminants of primary concern are arsenic, cadmium, copper, lead, and zinc.

More information concerning both the Active and Inactive Areas, and the rationale for separating the ponds into two operable units, is available in the recent (July 1991) Warm Springs Ponds Update.

Summary of Human Health and Environmental Risks

An assessment of human health and environmental risks was conducted by MDHES for the entire Warm Springs Ponds System. Human health risks were estimated and quantified for occupational, residential, and recreational scenarios. Environmental risks were assessed in a qualitative manner only.

Human Health Risks

Due to day-to-day contact with contaminated tailings, soils and water, people who work year round at the Warm Springs Ponds (occupational scenario) face greater in-

creased cancer risks than people who live nearby or use the area for recreation. MDHES estimated that workers here are faced with cancer risks being increased by 2 chances in 10,000 and people who use the ponds for recreation face an estimated increase of eight chances in 100,000.

Residents of the nearby community of Warm Springs and rural areas east of the ponds also face some estimated increase in cancer risk caused by inhalation and ingestion of wind-borne contaminants originating from the exposed tailings. The increase is estimated to be about one chance in 100,000.

EPA has selected remedies and taken actions at other Superfund sites that have reduced risks to one increased cancer per one million people or, under certain conditions, one per 10 million people. Conversely, EPA has elected to take no action in some instances where risks were greater than one per 10,000 people. Specific site conditions dictate highly variable risk management decisions among Superfund sites.

Whichever remedy is finally selected for the Inactive Area, when coupled with the remedy already selected for the Active Area and the remedy already implemented for the Mill-Willow Bypass, exposure to workers will be substantially reduced, and exposure to residents living nearby will be virtually eliminated. More significantly, the catastrophic risks associated with dam failure due to floods and earthquakes will be substantially reduced when the State's stringent dam safety requirements are met.

Environmental Risks

Early site studies of algae, fish, aquatic insects, and waterfowl, taken from the ponds and the Clark Fork River immediately downstream, were conducted primarily to determine whether edible fish and waterfowl are accumulating metals to the extent that humans who consume them might be at risk. While the risks to humans were found to be negligible, the studies showed that metals and arsenic accumulate in the plants and animals examined. In addition, there are clear indications that certain life stages of these organisms, such as eggs and developing young, or sensitive fish species, may be affected by the metals.

On the other hand, there are clear indications of productive wetlands and healthy populations of waterfowl, terrestrial and aquatic wildlife, invertebrates, and fish throughout the pond system. In spite of vast tailings deposits, contaminated surface and ground water, and contaminated pond bottom sediments, the area is a valuable fish and wildlife refuge.

Assessing ecological risks under conditions that are present at the Warm Springs Ponds is a new science. Procedures for assessing the long-term ecological effects of exposure to metals were just beginning to emerge 2 years ago. As these procedures are tested and perfected, more and more quantitative information will become available.

At this time, our understanding of the ecological risks present at the Warm Springs Ponds is limited and strictly qualitative; however, it would be unwise to delay the remedy for this area. EPA and MDHES recommend preserving the existing wetlands and fish and wildlife habitat. This recommendation postulates that the loss of the wetlands and waterfowl habitat would be too great an ecological loss, when compared to the perceived low level of exposure to metals. But, it also necessitates long-term ecological monitoring that must objectively validate or invalidate the premises for such a recommendation.

Objectives and Requirements

The remedy selected must substantially reduce or eliminate the above described risks to human health and the environment. In addition, there are legal requirements that must be met. Response objectives were derived from the need to reduce or eliminate identified risks and the need to meet federal, state, and local laws.

For **pond bottom sediments**, the response objective is to prevent releases of sediments during floods or earthquakes. The Montana Department of Natural Resources and Conservation dam safety requirements have been identified as the applicable standard. The standard requires protecting the ponds against a maximum credible earthquake and one-half of the estimated probable maximum flood.

For **surface water**, one response objective is to meet ambient water quality standards established pursuant to the Montana Water Quality Act for arsenic, cadmium, lead, mercury, copper, iron, and zinc at a compliance point just above the starting point of the Clark Fork River. Another surface water response objective is to prevent ingestion of water above the Montana Public Water Supply Act's maximum contaminant levels for arsenic, cadmium, lead, mercury, and silver, and established reference doses for copper, iron, lead, zinc, and cadmium. Another objective is to prevent ingestion of water containing arsenic in concentrations that would cause increased cancer risks greater than 1 in 10,000.

For **tailings deposits and contaminated soils**, the response objective is to substantially reduce the potential for direct contact, inhalation, and ingestion of exposed tailings and contaminated soils. This objective applies to both humans and fish and wildlife.

For **ground water**, the response objective is to reduce the levels of arsenic, cadmium, and other contaminant concentrations in the ground water in the Inactive Area to preclude offsite migration of water in excess of Montana ground water maximum contaminant levels.

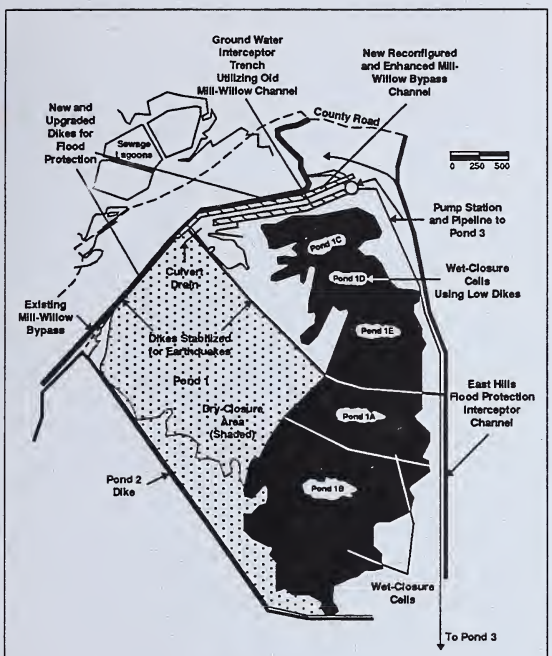


Figure 2
Modified Alternative 5
Preferred Remedy

Alternatives Evaluated

Originally, ARCO proposed a set of six alternatives and a no-action alternative. The alternatives evaluated by ARCO consist of Alternatives No. 1 through 7 and are described on the following pages. All six of these alternatives were combinations of wet and dry closure options; none of the alternatives included complete or total removal of the tailings and contaminated soils from the Inactive Area.

Public meetings were held in the fall of 1991 in Anaconda, Deer Lodge, and Missoula to discuss the alternatives proposed by ARCO. Individuals and special interest groups at the public meetings requested that EPA consider total removal of the tailings as an alternative. As a result, EPA and state officials returned to Missoula and Anaconda in late January of 1992 to meet with local officials and public interest groups to discuss new information concerning total removal. From these discussions, EPA prepared nine different total removal alternatives. From these nine, four were chosen and added to the original six alternatives proposed by ARCO for consideration in the Proposed Plan. The 10 action alternatives and the no-action alternative are described on the following pages.

The Preferred Remedy

After carefully examining 11 feasible alternatives and comparing them to the nine essential evaluation criteria described later in this Proposed Plan, EPA, in consultation with MDHES, recommends Alternative 5, with important modifications, as the response action best suited for Pond 1 and the area below Pond 1. See Figure 2.

As in every feasibility evaluation, value judgements were necessary in this case to achieve the best balance of tradeoffs with respect to the nine criteria. Alternative 5, as modified, is deemed by EPA and MDHES to provide the desired balance chiefly for the following reasons. If Alternative 5 is finally selected, it will:

- Substantially reduce or eliminate existing threats to human health and the environment within the Inactive Area itself and the Clark Fork River immediately below.
- Comply with all federal, state, and local laws and requirements.
- Prove to be a protective and effective remedy, both during and after construction.
- Be more easily implemented and cost less than any other alternative without sacrificing protectiveness or effectiveness.
- Meet all response objectives.
- Utilize a combination of treatment and waste containment measures to immobilize the metals and prevent their continued migration.
- Satisfy statutory requirements for protecting and restoring wetlands.
- Improve fish and wildlife habitat.

Additionally, Alternative 5 appears to be the remedy favored by the majority of interested Clark Fork River basin residents. This conclusion is based on comments heard during a series of public scoping meetings and numerous letters received following the meetings.

Alternative 5 requires important modifications to assure that the entire complement of objectives and criteria listed above will eventually be achieved. Briefly, the modifications recommended by EPA and MHDES are as follows:

- Long-term ecological monitoring, or biomonitoring, must accompany the decision to chemically fix and wet-close the exposed deposits of tailings and contaminated soils. The proposed method of treatment and containment is appropriate in this instance for many reasons; however, the long-term effects of biologic communities and individual species living in contact with tailings treated and left in place is not well known. Biomonitoring will reveal trends that will, in time, enable EPA and the public to objectively validate or invalidate the premises for recommending chemical fixation and wet-closure.

- The remedy is an interim remedy. For the reasons discussed in the first modification, and because the tailings and contaminated soils will be contained in place, on-site, Alternative 5 cannot be termed a final remedy. EPA's recommendation for Alternative 5 is being made with the expectation that it will, in time, prove to meet all of the necessary objectives and criteria; however, until that demonstration is clearly made, the remedy will be an interim measure subject to review and reevaluation.

- Reconstruction of the lower Mill-Willow Bypass must be carried out. Alternative 5 necessitates a protective berm and ground water interception trench along the existing configuration of the bypass. This modification is the logical extension of the requirement for bypass channel reconstruction associated with the remedy already selected for the Active Area (Ponds 2 and 3). It is necessary to complete the connection between the upper reaches of Mill and Willow creeks and the Clark Fork River.

In conclusion, the preferred remedy, Alternative 5 as modified, affords the opportunity to implement a remedy that meets or exceeds essential criteria, satisfies the response objectives, is the least costly alternative, and provides the greatest environmental benefits that can be practicably achieved.

Alternative No. 1 (Dry Close Pond 1, Remove Below Pond 1)

This alternative consists of the following:

- Draining the wet areas within Pond 1 and capping/covering (dry closing) all tailings and associated soils and pond bottom sediments located within the pond
- Constructing a groundwater dewatering/interception trench system within and immediately below the pond
- Constructing a flood runoff interceptor channel in the east hills above the pond
- Lowering and modifying the east to west Pond 1 dike
- Removing all tailings below Pond 1 to the Mill-Willow Bypass for dry closure within Pond 1

Alternative No. 2 (Dry Close Pond 1, Wet Close Below Pond 1)

This alternative includes all of the actions described under Alternative No. 1 except for removing tailings and associated soils below Pond 1. In addition, actions to be implemented would include the following:

- Constructing low dikes in the area below Pond 1 so that lime can be added to the exposed tailings and they can be flooded with higher pH water (wet closure)
- Constructing a flood interceptor channel below Pond 1 to intercept flood flow originating in the hills east of the Inactive Area
- Constructing a north extension of the Mill-Willow Bypass flood protection dike
- Constructing a groundwater interception trench and associated pumping equipment and pipe at the lower end of the area below Pond 1 to pump the intercepted ground water back to Pond 3 for treatment
- Constructing a replacement for a portion of the existing Mill-Will Bypass channel used for the groundwater interception trench

Alternative No. 3 (Dry Close Pond 1, Dry Close Below Pond 1)

This alternative is the same as Alternative No. 1 for Pond 1 except that it considers covering/capping the tailings located below Pond 1 in place rather than removing them to Pond 1. In addition to the actions indicated for Pond 1 in Alternative No. 1, this alternative would require the following:

- Dry closing tailings and associated soils below Pond 1
- Constructing a downgradient groundwater interception trench and the associated return flow pumping and piping system
- Replacing a portion of the existing Mill-Willow Bypass channel

- Extending the flood protection dike along the Mill-Willow Bypass
- Constructing the east hills flood interceptor channel required for protecting the area below Pond 1

Alternative No. 4 (Wet/Dry Close Pond 1, Remove Tailings Below Pond 1

This alternative proposes a combination of dry and wet closure for the western and eastern portions, respectively, of Pond 1, and removal of all tailings below Pond 1. Implementation of this alternative with respect to Pond 1 will also require the following:

- Stabilizing the east to west dike of Pond 1
- Incorporating a groundwater interception system with the related pumpback facilities immediately below Pond 1
- Constructing the east hills flood interceptor channel

Alternative No. 5 (Wet/Dry Close Pond 1, Wet Close Below Pond 1)

This alternative consists of the following:

- Dry closing and chemical fixing the dewatered or partially dewatered western portions of Pond 1
- Wet closing the submerged tailings with the eastern portion of Pond 1
- Stabilizing the east-west berm for maximum credible earthquake protection
- Wet closing the tailings located below Pond 1, by constructing the series of low dikes followed by lime incorporation and flooding
- Converting the present Mill-Willow Bypass channel into a groundwater interception trench with associated pumping equipment to return interceptor groundwater to the Active Area for treatment
- Relocating and restoring the lower Mill-Willow Bypass channel
- Extending the flood-proection dike northward along the newly constructed Mill-Willow Bypass channel
- Constructing a runoff interception system along the east side of the Inactive Area to divert east hills floods around the wet closure cells
- Implementing a long-term ecological monitoring program to evaluate long-term recovery of the pond ecosystem

This alternative is the preferred remedy and is examined throughout this Proposed Plan.

Alternative No. 6 (Wet/Dry Close Pond 1, Dry Close Below Pond 1)

This alternative treats Pond 1 in the same way as it is treated in Alternative No. 4, and dry closure of the area below Pond 1 is similar to Alternative No. 3.

Alternative No. 7 (No Action)

Alternative No. 7 is the no-action alternative required under CERCLA and is used as a baseline against which other alternatives are evaluated.

Alternative No. 8 (Total Removal, Repository near East Hill)

Alternative No. 8 includes excavating wet and dry areas of Pond 1, excavating wet and dry areas below Pond 1, and truck transport of excavated materials to a site in the foothills approximately one-half to one mile east of Pond 1. The dry areas of the Inactive Area would be excavated using a combination of conventional excavation equipment including bulldozers, backhoes, front-end loaders, and scrapers. Excavated dry material would be loaded onto 60 cubic yard off-road trucks for transport. The wet areas of the Inactive Area would be excavated using either mechanical dredging (clamshells or draglines) or hydraulic dredging (cutter head suction dredge) depending upon conditions. Excavated material from the mechanical dredging would be loaded onto trucks for transport. The excavated material from the hydraulic dredging would be pumped to a centrally located gravity thickener. Underflow from the gravity thickener would be pumped directly into trucks for transport. The trucks would have to be modified with liners or other methods to contain the wet materials without spilling or leaking.

Excavated material would be deposited at the repository site, where surface drainage systems would be implemented to channel surface water flows and prevent erosion. After all excavated material has been deposited and dried, the materials would be capped and revegetated.

Alternative No. 9 (Total Removal, Repository in Pond 3)

This alternative is identical to Alternative No. 8, except that excavated material would be disposed of in a dry area within the Pond 3 berms. This area would be covered and revegetated after disposal.

Alternative No. 10 (Total Removal, Repository in Opportunity Ponds)

This alternative is identical to Alternative No. 8, except for the transport of excavated materials and the repository

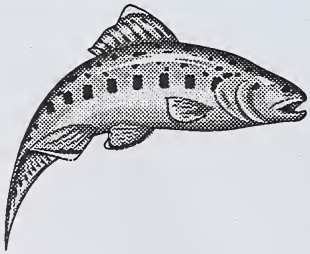
location. All excavated materials (both wet and dry) would be trucked or pumped, as appropriate, to a centrally located materials processing/conditioning facility. This facility would include the gravity thickener (for hydraulically dredged materials), a mixing facility, and a pug mill to mix the wet and dry materials in the proper proportions to allow efficient conveyor transport. It was assumed that a 48-inch belt conveyor with a capacity of approximately 1,000 ton/hour would be required to transport all of the materials within a 3-year time frame.

The materials would be transported to a fixed point discharge at the Opportunity Ponds repository. From there, shiftable conveyor sections would be used to deposit the materials. After all excavated material has been deposited and dried, the materials would be capped and revegetated.

Alternative No. 11 (Total Removal, Repository in Anaconda Ponds)

This alternative is similar to Alternative No. 10, except that transport of excavated materials would be by slurry pipeline to the Anaconda Ponds repository. All excavated materials would be trucked or pumped, as appropriate, to a centrally located materials handling facility. This facility would include a pug mill/sizing system and a mixing facility to mix the wet and dry materials. It would also add water in the proper proportions to allow transportation in a slurry pipeline. It was assumed that the materials would be pumped at approximately 30 percent solids (by weight). This would require pumping at approximately 2,200 gpm (two shifts) to move all the materials within a 3-year time frame.

The repository site would have a different configuration from the other alternatives. It would likely be composed of multiple cells (four to eight cells) to allow for efficient deposition and handling of slurry materials. After all tailings have been transported to the repository, the materials would be allowed to dry out through evaporation. If regulatory agencies would allow it, the drying process could be quickened by decanting free water to the surface of the Anaconda Ponds outside the repository. However, even with decanting, it would likely be several years before the surface would be stable enough to support equipment. The repository would then be capped using a geomembrane, followed by limestone, soils, and native vegetation. The geomembrane must allow capping within a reasonable period of time.



EPA is required to apply the following nine criteria to evaluate alternatives. While overall protection of human health and the environment is the concern, the recommended alternative selected for the site must achieve the best balance among the evaluation criteria considering the scope and relative degree of the contamination at the site. EPA's preferred remedy achieves this objective.

1. **Overall Protection of Human Health and the Environment** addresses how the alternative, as a whole, will protect human health and the environment. This includes an assessment of how public health and environmental risks are properly eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2. **Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)** addresses whether or not a remedy complies with all state and federal environmental and public health laws and requirements that apply or are relevant and appropriate to the conditions and remediation options at a specific site. If an ARAR cannot be met, the analysis of the alternative must provide the grounds for invoking a statutory waiver.

3. **Long-term effectiveness and Permanence** refers to the ability of an alternative to maintain reliable protection of human health and the environment overtime once the remediation goals have been met.

4. **Reduction of Toxicity, Mobility, or Volume** are three principal measures of the overall performance of an alternative. The 1986 amendments to the Superfund statute emphasize that, whenever possible, EPA should select a remedy that uses a treatment process to permanently reduce (1) the level of toxicity of contaminants at the site; (2) the spread of contaminants away from the source of

contamination; and (3) the volume, or amount, of contamination at the site.

5. **Short-term Effectiveness** refers to the likelihood of adverse impacts on human health or the environment that may be posed during the construction and implementation of an alternative until remediation goals are achieved.

6. **Implementability** refers to the technical and administrative feasibility of an alternative, including the availability of materials and services needed to implement the alternative.

7. **Cost** includes the capital (upfront) cost of implementing an alternative, the cost of operating and maintaining the alternative over the long-term, and the net present worth of capital and operation and maintenance costs.

8. **State Acceptance** addresses whether, based on its review of the Remedial Investigation/Feasibility Study (RI/FS), the FS supplement, and Proposed Plan, the State concurs with, opposes, or has no comment on the alternative EPA is proposing as the remedy for the site.

9. **Community Acceptance** addresses whether the public concurs with EPA's Proposed Plan. Community acceptance of this Proposed Plan will be evaluated based on comments received at the upcoming public meeting and during the public comment period.

Comparative Analysis of Alternatives

The alternatives outlined above were evaluated based on the nine criteria that the agencies are required by federal regulation to use when comparing the various cleanup alternatives. The no-action alternative does not meet any of the evaluation criteria and is not addressed in this discussion.

Overall Protection of Health and the Environment

All action alternatives protect human health and the environment. Dry and wet closures of tailings and contaminated soils discussed in Alternatives 1 through 6 will prevent human contact and will significantly decrease migration of contaminants into the ground water. For wet closure, there is a potential risk of continued exposure to metal-bearing tailings and precipitates.

Complete removal of tailings and contaminated soils below Pond 1 (Alternatives 1 and 4) and total removal of these materials (Alternatives 8, 9, 10, and 11) would reduce the potential area for direct exposure. Alternatives 2, 3, 5, and 6, (wet and dry closures of the Inactive Area) would involve leaving contaminated material below Pond 1, but the risk of direct contact would be reduced significantly either by covering the area with a soil cap or by flooding it with water.

Removal below Pond 1 (Alternatives 1 and 4) and total removal (Alternatives 8 through 11) are protective in terms of human health and permanence of the remedial action. Removal of tailings from the Inactive Area reduces onsite risks of direct exposure to tailings and other contaminated materials and removes the source of groundwater contamination. However, risk of direct exposure and risk to ground water could occur at the waste repository site. Removal would substantially reduce or eliminate migration of contaminated materials to ground water, whereas wet or dry closure would significantly reduce the risk to minimal levels.

Portions of the remaining resulting excavations from Alternatives 1, 4, 8, 9, 10, and 11 would subsequently develop into shallow ponds and eventually create improved wetlands, although for Alternatives 1 and 4, this would only apply to the area below Pond 1.

Dry closure by draining the area and covering it with an earthen cap would result in the loss of existing wetlands (albeit some are of marginal value). Implementation of Alternatives 1 and 3, which propose dry closure of Pond 1 coupled with removal or dry closure below Pond 1, would result in the greatest loss of wetlands. Alternatives 4 and 6 expand and enhance waterfowl habitat and improve the value of existing wetlands in the eastern third of Pond 1 and below Pond 1.

Alternatives 1 through 6 would create positive environmental impacts by establishing grasslands habitat in the presently unvegetated areas of exposed tailings or pond bottom sediments in the western portion of Pond 1.

Compliance with Federal and State Environmental Standards

All the action alternatives would comply with applicable or relevant and appropriate federal and state requirements for the site.

Long-Term Effectiveness

Complete removal below Pond 1 (Alternatives 1 and 4) and complete removal (Alternatives 8 through 11) do not reduce the overall residual risks as well as either dry closure (Alternatives 3 and 6) or wet closure (Alternatives 2 and 5). With either wet or dry closure, minimal risks remain relative to the potential for migration of the contaminants. All of the alternatives would prevent offsite migration of ground water that exceeds maximum contaminant levels (MCLs).

Alternatives 8 through 11 have long-term effectiveness as a result of complete removal of the tailings and contaminated soils. This removal eliminates the potential at the site for any direct contact; however, those risks could be subsequently transferred to the repository site where the contaminants would be placed.

Alternative 9, disposal in Pond 3, may be impacted by future remediation efforts if it is ultimately determined that materials must be removed from Pond 3.

Alternative 4 includes the capability to control sediment in runoff from the east hills as compared with Alternative 5. Under Alternative 4, the dredge return water to below Pond 1 would contain some minor residual contamination. Under Alternative 4, the 100-year flood could potentially recontaminate the area below Pond 1, whereas under Alternative 5, the area below Pond 1 would be protected from the 1/2 probable maximum flood (PMF).

Reduction of Toxicity, Mobility, and Volume

Alternatives 1, 4, and 8 through 11 reduce the potential mobility of contaminants by removing them from the historic flood plain. Alternatives 2, 3, 5, and 6 leave contaminants within the historic flood plain but protect them up to the 1/2 PMF.

Alternatives 10 and 11 may be susceptible to contaminant mobility resulting from floods less than 1/2 PMF and earthquakes less than the maximum credible earthquake since they are placed on waste deposits not currently protected from these type of events.

Excavation and removal (Alternatives 1, 4, 8, 9, 10, and 11) would increase waste volume by bulking the soil during excavation.

None of the alternatives would change the toxicity or persistence of contaminants associated with solid materials. Metal contaminants are not amenable to being destroyed or easily changed into relatively inert compounds. Alternatives 2, 4, 5, and 6, which in part use wet closure (flooding/chemical fixation), reduce the mobility of most contaminants.

The potential for mobilizing the tailings and associated soils and pond bottom sediments because of wind, floods, or earthquakes is reduced to low levels for all action alternatives except 10 and 11.

Short-Term Effectiveness

All alternatives will affect the community of Warm Springs to some degree during implementation.

Alternatives 1 through 6 can be fully implemented over a 2-year construction period. Alternatives 8 through 11 would require 3 to 4 years to complete because of the large volume of material to be moved. Some additional time may be required to obtain the necessary permits associated with remediation.

Alternative 8 would require purchase of property in the east hills and could be subject to land use requirements.

Excavation Alternatives 1, 4, 8, 9, 10, and 11 would disturb existing wetlands below Pond 1, although wetlands around the excavation perimeter would develop over time.

Implementability

The majority of components proposed for the alternatives are well developed technologies and could be implemented at the Inactive Area in a straight forward manner. This includes excavation and removal activities involving draglines, bulldozers, front-end loaders, scrapers, and other conventional earthmoving equipment.

For Alternatives 1 and 4, and 8 through 11, removal of material would require both mechanical and hydraulic dredging, which would be difficult to implement. Dredging would be difficult because of poor equipment support conditions, encountering debris including logs and vegetation, and having to dewater dredged materials. For Alternatives 8 through 11, dredged material would also require mixing with dryer excavated materials in order to belt convey the material.

Alternatives 10 and 11 may be relatively difficult to implement because of legal and community concerns. Residents near the Anaconda and Opportunity repository sites may be concerned about the placement of additional large volumes of wastes on the existing dry tailings impoundments. In addition, the existing impoundments are not constructed to meet current flood and earthquake criteria. Therefore, it may be impractical to use them as repositories until they have been upgraded.

Cost Summary Table			
	Total Construction Cost	Operation and Maintenance	Project Present Worth
Alternative No. 1	$28,435,218	$ 671,800	$29,100,100
Alternative No. 2	26,219,725	1,320,500	27,500,000
Alternative No. 3	26,872,495	1,157,500	28,000,000
Alternative No. 4	20,338,998	851,700	21,200,000
Alternative No. 5	17,115,069	1,033,100	18,100,000
Alternative No. 6	17,921,020	870,100	18,800,000
Alternative No. 7	0	0	0
Alternative No. 8	49,592,025	860,900	50,500,000
Alternative No. 9	49,261,412	773,300	50,000,000
Alternative No. 10	48,769,448	773,300	49,500,000
Alternative No. 11	49,866,473	790,200	50,700,000

NOTE: Present worth is calculated by amortizing the Operation and Maintenance cost over 30 years at a 5 percent discount rate.

Cost

The capital, operations and maintenance, and present worth costs for the 11 alternatives are presented in the table above. The agencies have determined that Alternative 5 would be the most cost-effective alternative for remediation of the Inactive Area. Alternative 5 would have the lowest cost and would be protective of human health and the environment. It would also provide long-term effectiveness by maintaining the closure areas.

State Acceptance

MDHES has been consulted throughout this process and is in agreement with EPA on the evaluation and selection of the preferred remedy.

Community Acceptance

Community comments will assist EPA and MDHES in selecting the remedy for remediating the Inactive Area and will be documented in the decision document. Based on new information presented during public comment, EPA and MDHES may modify the preferred alternative or consider another of the response actions included in this plan and the Feasibility Study/Alternatives Evaluation reports. Throughout the course of this last year, EPA met with the public to develop the most feasible alternative. Although there are some varying opinions, many members of the community concur with EPA on the choice of Alternative 5. The public is encouraged to review and comment on all of the alternatives identified in this Proposed Plan or to suggest additional alternatives for consideration.

EPA's Rationale for Proposing the Preferred Remedy

Based on current information and analysis of the Remedial Investigation, feasibility studies, and the Alternatives Evaluation documents, EPA believes that the preferred remedy for the Warm Springs Ponds Inactive Area is consistent with the requirements of the Superfund law and its amendments and with the National Contingency Plan.

Except for the no-action alternative, all of the alternatives presented in this Proposed Plan would provide overall protection of human health and the environment. In EPA's analysis, however, the preferred remedy identified in this Proposed Plan is more readily implementable and cost-effective than the other alternatives considered. In addition, in EPA's estimation, the preferred remedy would achieve the best balance among the criteria used by EPA to evaluate the alternatives. The preferred remedy would provide short- and long-term protectiveness of human health and the environment, would attain all applicable and appropriate federal and state public health and environmental requirements (ARARs), and would reduce the mobility and toxicity of contaminated surface and ground water through treatment and the use of permanent solutions to the maximum extent practical.

Many of the previous listed documents can be found at these information repositories:

- Montana Tech Library/Butte
  West Park Street
- Butte EPA Office
  Court House
- Grant-Kohrs Ranch Office/Deer Lodge
  Main Street
- Mansfield Library/Missoula
  University of Montana Campus
- Montana State Library/Helena
  Capitol Complex
- USEPA Library/Helena
  301 South Park
- Hearst Free Library/Anaconda
  Fourth and Main

For further information regarding the Warm Springs Ponds, contact the following individuals:

Pam Hillery or Scott Brown
USEPA, Montana Office
301 South Park, Drawer 10096
Helena, MT 59626
1-(406) 449-5414

Janie Stiles or Neil Marsh, MDHES
Solid & Hazardous Waste Bureau
616 Helena Ave.
Steamboat Block
Helena, MT 59620
1-(800) 648-8465

Mailing List

If you would like information on any Montana Superfund site, please mail this form to Pam Hillery, USEPA, Montana Office, 301 South Park, Drawer 10096, Helena, MT 59626.

Name _____

Address _____

City/State _____

Site(s) interested in:

Montana Pole____
Silver Bow Creek/Butte____
Idaho Pole____
East Helena ____
Anaconda Smelter____
Mouat____
Libby____
Milltown____

EPA Region 8
Montana Office
301 S. Park, Drawer 10096
Helena, Montana 59626

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